

NERRS Science Collaborative Progress Report for the Period 9/1/2011 through 2/29/2012

Project Title: A collaborative approach to address larval supplies and settlement as critical early life-history issues during restoration of native Olympia oysters (*Ostrea lurida*) in Coos Bay and the South Slough estuary

Principal Investigator(s): Dr. Steven Rumrill

Project start date: Nov 2010

Report compiled by: Steven Rumrill / John Bragg

Contributing team members and their role in the project:

Integration Leader: Frank Burris, Extension Watershed Educator
Oregon State University Extension Service
Gold Beach, OR
Role in project: Facilitation of interactions between the stakeholders (Olympia Oyster Restoration Advisory Committee) and project team members. Mr. Burris has expertise with community stakeholder discussions in rural environments, and will provide for integration and leadership through the joint fact-finding / structured decision-making process.

Co-Principal Investigators: Dr. Craig Young, Professor of Biology
University of Oregon / Oregon Institute of Marine Biology
Charleston, OR
Role in project: Director of OIMB and collaborating project scientist with particular expertise in the reproductive biology and larval ecology of marine and estuarine invertebrates. Dr. Young will serve as the primary graduate thesis advisor for one graduate student (module 1 / reproduction and reproductive output) supported by the project.

Dr. Alan Shanks, Professor of Biology
University of Oregon / Oregon Institute of Marine Biology
Charleston, OR
Role in project: Collaborating project scientist with particular expertise in larval behavior, dispersal, and tidally-driven transport in estuaries. Dr. Shanks will serve as the primary graduate thesis advisor for one graduate student (module 2 / larval supplies and dispersal) supported by the project.

Dr. Richard Emlet, Professor of Biology
University of Oregon / Oregon Institute of Marine Biology
Charleston, OR
Role in project: Collaborating project scientist with particular expertise in larval development, hydromechanics, larval settlement, and metamorphosis. Dr. Emlet will serve as the

primary graduate thesis advisor for one graduate student (module 3 / larval settlement and metamorphosis) supported by the project.

Jamie Doyle, Marine Community Development Leader
Oregon Sea Grant Extension Program (Coos County)
Myrtle Point, OR

Role in project: Work with project team to develop a series of presentations, fact sheets, briefing materials to ensure that the stakeholders and scientists share a common level of understanding about the biology and ecology of Olympia oysters. Ms. Doyle has expertise with marine resource policy and management, community education, and outreach, and she will provide assistance to the Integration Leader with the SDM process.

John Bragg, Communications Leader
Coastal Training Program Coordinator
South Slough National Estuarine Research Reserve
Charleston, OR

Role in project: Work to conduct regular and routine communications among members of the project team and the NERRS Science Collaborative, to compile and summarize discussion notes generated during OORAC meetings, serve as co-author of the NSC Biannual reports, and assist with development of presentations, fact sheets, and briefing materials. Mr. Bragg has expertise with condensation of technical research materials into summary sheets, and will provide an interface for the project with the South Slough National Estuarine Research Reserve. John will also provide assistance to the Integration Leader with the SDM process.

- A. Progress overview: State the overall goal of your project, and briefly summarize in one or two paragraphs, what you planned to accomplish during this period and your progress on tasks for this reporting period. This overview will be made public for all reports, including confidential submissions.

Project Goal: The overall goal of this project is to investigate the importance of reproductive timing and output, larval supplies, estuarine retention time, settlement, and recruitment as factors that potentially limit recovery of self-sustaining populations of *Ostrea lurida* in Coos Bay and the South Slough estuary. Our specific objectives are to: (A) bring together a diverse group of stakeholders and user-groups to form an Olympia Oyster Recovery Advisory Committee (OORAC); (B) determine the suite of intrinsic ecological, reproductive, and early life-history factors that contribute to the success of Olympia oyster restoration efforts in Coos Bay/South Slough; and (C) integrate the perspectives and collective knowledge from resource agencies, academic investigators, mariculture operators, restoration practitioners, and recreational stakeholders during development of an Olympia Oyster Conservation and Recovery Strategy for Coos Bay.

Accomplishments: The third graduate student supported by the NSC Project (Catherine Pritchard) joined the science team in mid-September 2011, and she will work under the direction

of Dr. Alan Shanks to conduct thesis work that focuses on the dispersal and retention of Olympia oyster larvae in the Coos Bay tidal basin. Catherine will work in coordination with the two other graduate students (Mark Oates and Rose Rimler) who joined the project team earlier in the summer of 2011. Mark Oates will focus his thesis work on oyster reproduction and reproductive output, and Rose Rimler will conduct her thesis work on the larval settlement and metamorphosis of Olympia oysters.

A meeting of the NSC Olympia oyster project team was held in October 2011 at the Oregon Institute of Marine Biology (OIMB). During the meeting, the team members discussed several topics including: (1) the overall purpose and collaborative approach taken by the project, and the ways that the NSC Olympia oyster project will differ from conventional graduate thesis projects undertaken at OIMB. The discussion included a dialog about the Joint Fact-Finding process that will be used to guide the three new science investigations conducted by the graduate students, and the Structured Decision-Making process that will be followed by the science team and OORAC to develop the Olympia Oyster Conservation and Recovery Strategy. The project team also discussed: (2) the background information and progress that has been made to date on understanding the reproductive biology, larval ecology, and population recovery for Olympia oysters in Coos Bay and the South Slough; (3) recent research findings generated by a visiting Post-doctoral investigator (Dr. Laura Garcia-Peterio); (4) the distinct foci and complementary interaction among modules 1-3 of the NSC Olympia oyster project; and (5) further development of a unifying conceptual model to illustrate Olympia oyster life-cycle and the biophysical dynamics of the Coos Bay estuary. The project team meeting ended with a discussion of (5) application of the background information and new science to a series of local resource management issues. These local issues include: (a) perceived conflicts between federal siting of a liquefied natural gas terminal and the potential impact on Olympia oyster populations in Haynes Inlet; (b) settlement and maturation of native Olympia oysters on the shells of commercially-cultivated non-indigenous Pacific oysters (*Crassostrea gigas*); and (c) recent discovery of Olympia oyster shells at the mouth of the Alsea Bay estuary (possible evidence for a distinct population located 145 km north of Coos Bay established recently by deliberate out-planting).

The project PI (Steve Rumrill) held a project coordination/communication meeting in October with Integration Leader (Frank Burris) and Communications Leader (John Bragg) to discuss the format for the meeting of the stakeholder advisory committee (Olympia Oyster Recovery Advisory Committee), and the approach to address the emerging local issues that are outside the scope of the NSC project. In addition, Steve met one-on-one (and/or held phone call discussions) in October and November 2011 with several members of the OORAC (*i.e.*, commercial shellfish growers L. Clausen; D. Landkammer, B. Dumbauld, M. Vance, J. Groth, D. Van der Schaaf, E. Clough) to talk about their participation as stakeholders, and to gain their input about the priority science questions and approaches taken by the graduate students to conduct new science that will be relevant to the local concerns.

A joint meeting of the NSC Project Team and the Olympia Oyster Recovery Advisory Committee (OORAC) was held at the Oregon Institute of Marine Biology on 28 Feb 2012 (9:00 AM to 3:30 PM). The meeting was attended by 24 people, and the first part of the agenda (Appendix A. below) included: (1) discussion about the purpose of the project and the role of the OORAC; (2) introductions of the project team and advisory committee members; and (3) an overview of the collaborative process followed to gain input from the OORAC. The second part of the meeting included: (4) a series of presentations of background material presented jointly by members of the project team (S. Rumrill) and OORAC members (R. Miller, S. Groth, L. Garcia-Peterio) that were designed to bring the meeting participants to a common level of understanding about the

life-history and current status of recovery for Olympia oysters in Coos Bay and the South Slough estuary. The presentations of background information were followed by a discussion session to gain feedback and input from the OORAC members. The third part of the meeting included: (5) presentations by the graduate students about the focus, questions, and approaches for the three new science components of the NSC project (module 1 / reproduction (M. Oates); module 2 / larval supplies (C. Pritchard); module 3 / larval settlement (R. Rimler), each followed by a discussion session to gain feedback and input from the OORAC members. The final part of the meeting included: (6) discussion about incorporation of results from the new science projects into development of an Olympia Oyster Conservation and Recovery Strategy for Coos Bay; (7) the preferred mechanism for OORAC communications and joint development/delivery of technical information; and (8) a wrap-up discussion to review the priority issues, data gaps, meeting schedule, and next steps.

In preparation for the OORAC meeting, the NSC project team developed a series of six two-page fact sheets, each focused on a different aspect of the overall project. The fact sheets (enclosed) are titled:

- Collaborative process to assist with research and recovery for populations of native Olympia oysters
- Natural history, geographic distribution, and life-cycle of Olympia oysters
- Restoration and recovery of native Olympia oysters in the South Slough estuary, Oregon
- Observations of gonad structure and gametogenic timing in a recovering population of Olympia oysters
- Larval abundance and dispersal as critical factors in the recovery of Olympia oysters in Coos Bay
- Larval settlement and post-settlement mortality as determinants of the spatial distribution of Olympia oysters in Coos Bay

The new fact sheets were coupled with previous outreach materials (*i.e.*, NSC project summary sheet, technical paper on history of Olympia oysters in Oregon estuaries) to form the package of materials presented to the OORAC members before and throughout the meeting. Each of the new fact sheets was designed to present technical information in a condensed and informative manner, and help focus the input and feedback received from OORAC on specific aspects of the overall NSC project. Taken as a whole, the series of existing (and future) fact sheets constitute an integrated package of educational/outreach materials that will be of utility to OORAC throughout the project. In addition, the fact sheets will also help meet outreach needs about Olympia oysters and the new research activities that extend beyond the scope of the NSC project. Members of the project team (J. Bragg / Communications Leader and Jamie Doyle / Marine Community Development Leader) facilitated a discussion with OORAC to evaluate the effectiveness of the fact sheets as a mechanism to facilitate the transfer of educational information and to serve as a forum for technical communications with OORAC.

The Integration Leader (F. Burris) served as the facilitator for group discussions during the OORAC meeting, and he guided the participants through the process to provide their input and feedback in three ways. First, important issues raised during the discussion sessions were written up as notes taken by the Communication Leader (J. Bragg) and projected on a screen for all to see (the written notes were also supplemented by additional notes on an easel board). Second, questions and concerns by OORAC members were written on note cards that were collected at the end of the meeting. Third, the meeting participants were provided with a feedback form that directly solicited their input, questions, thoughts, and ideas for six distinct

aspects of the project: (1) structure and frequency of OORAC meetings; (2) new science module 1 / reproduction of Olympia oysters; (3) new science module 2 / larval supplies and dispersal; (4) new science module 3 / larval settlement and metamorphosis; (5) development of a conservation and recovery strategy for oysters in Coos Bay; and 6) education/outreach materials and communication techniques. Feedback received from OORAC is currently being incorporated by the students into the proposals that will guide their graduate thesis research.

In addition to providing input on the direction and approaches taken by the graduate students on the new science aspects of the project, two additional important issues were raised by the OORAC. First, OORAC highlighted the need for summary and clarification of the diverse state, federal, and regional agency jurisdiction over management of commercial oyster cultivation activities in Coos Bay. The project team will address this jurisdictional issue as a distinct topic for presentation during the next OORAC meeting, and will accompany the presentation and discussions with an informational fact sheet. Second, OORAC also identified a high-priority need to immediately complete a baseline survey of the distribution and abundance and size-structure of Olympia oysters throughout the intertidal shoreline of Coos Bay.

B. Working with Intended Users:

- Describe the progress on tasks related to the integration of intended users into the project for this reporting period
- What did you learn? Have there been any unanticipated challenges or opportunities?
- Who has been involved?
- Has interaction with intended users brought about any changes to your methods for integration of intended users, the intended users involved, or your project objectives?
- How do you anticipate working with intended users in the next six months?

Integration and unanticipated opportunities: The PI (Steve Rumrill) held a series of face-to face meetings and phone-call discussions with most of the project stakeholders and members of OORAC the Olympia Oyster Recovery Advisory Committee in preparation for the meeting in February. The discussions were held to re-familiarize the stakeholders with the purpose, scope, and approach of the NSC Olympia oyster project, to gain their perspectives on priority issues related to the recovery of Olympia oyster populations, and to encourage their participation as members of the OORAC. Prior to the meeting discussions with four OORAC members were particularly informative:

- OORAC member Jennifer Groth (City Councilor for the City of Coos Bay) asked “why she was identified as a member of this group that studies the biology of oysters?” Steve Rumrill provided the answer that engagement and participation by the City of Coos Bay is essential to development of an effective conservation and recovery strategy for the Olympia oysters, and that the recovery strategy would likely include a series of new habitat enhancement activities along the estuary shoreline immediately adjacent to the Coos Bay boardwalk. Ms. Groth agreed that the City of Coos Bay should participate in planning for the conservation strategy, and that the project team should give a presentation at a future meeting of the City Council.
- OORAC Member Bill Richardson (City Councilor for the City of North Bend) is a life-long resident of Coos Bay, an avid recreational clammer, and he expressed great interest in the recovery of local populations of Olympia oysters. Mr.

Richardson encouraged the project team and OORAC to consider implementation of Olympia oyster habitat enhancement activities along the industrial shoreline of North Bend as a component of their new city boardwalk improvement project, and to bring the project to the North Bend City Council and the South Coast Economic Development Council in the form of presentations and proposals. These issues were raised by Mr. Richardson during the OORAC meeting and will be incorporated into the development of the Olympia oyster conservation and recovery strategy.

- OORAC member Cory Sause (Sause Ocean Towing) was very pleased to learn that populations of Olympia oysters are exhibiting signs of recovery along the industrial shoreline used by the commercial towing company to berth their ocean-going vessels, and she reiterated the offer on behalf of Sause Ocean Towing to make use of their floating docks as a site for experiments and monitoring efforts to gauge the settlement of Olympia oyster larvae at this strategic location in Coos Bay.
- OORAC member Don Ivy (Coquille Indian Tribe) provided his understanding and perspective that the Olympia oyster was only a minor component of the diets of the indigenous peoples, and that they only rarely occurred in the middens of historic village sites. This understanding is consistent with the appreciation that the indigenous peoples used the Olympia oysters as a supplemental source of food rather than as a primary food source, and that the collection activities were most likely focused on the intertidal populations rather than on the more abundant and larger oysters that are believed to inhabit the subtidal channels.
- OORAC Member Laura Hoberecht (NOAA Northwest Region Aquaculture Coordinator / Seattle) expressed her interest in the progress of the recovery and in development of the Olympia oyster conservation strategy. Ms. Hoberecht would like to participate in the OORAC discussions that focus on Coos Bay via long-distance communications, and she raised the possibility of pursuing a state-wide Oregon Shellfish Initiative that would include restoration/enhancement of Olympia oysters, improvement in mariculture operations, and estuary habitat improvements.

Changes to methods of integration: Despite their interest in the recovery of Olympia oysters and the activities encompassed by the NSC project, the four commercial mariculture operators in Coos Bay were not able to participate directly in the February meeting of OORAC members. It has become clear that a “one-size fits-all” approach to working with the stakeholders will not be effective to gain further input from this key group. During the OORAC meeting the project team proposed to meet as a smaller gathering with the commercial oyster growers (perhaps as small group meetings of 3-5 people or as a series of one-on-one meetings to gain their input about the new science and direction for the conservation plan). In addition, the project team will respond favorably to the invitation to give presentations about the recovery, new science, and conservation plan for Olympia oysters at city council meetings.

During the next six months: Input received from OORAC will be integrated into the proposals and workplans for new science developed by the three graduate students. In particular, the students will use the feedback and comments provided by OORAC to further refine and focus their research questions and methodological approaches, and to think more about the ultimate utility of the data products and their contributions to the local conservation plan. Input from

OORAC also served as a forum for better coordination and integration of the three components of the new Olympia oyster science effort, and to consolidate the acquisition of environmental and ecological data at only a few key study sites located at strategic points in Coos Bay (*i.e.* Haynes Inlet, Downtown Boardwalk, Coalbank Slough, Isthmus Slough). During the next six months we will: (1) compile and distribute the notes from the OORAC meeting to all of the participants; (2) finalize the graduate student workplans and supervise their research activities during the spring; (3) work with OORAC to design and coordinate a baseline survey of the distribution and abundance of Olympia oysters throughout the intertidal shoreline of Coos Bay as a new component of the conservation plan; (4) develop a fact-sheet to clarify and summarize the state, federal, and regional agency jurisdiction over management of commercial oyster cultivation activities in Coos Bay; and (5) schedule the next OORAC meeting. Several members of the project team and OORAC will attend the National Shellfisheries Association conference in Seattle, WA (March 26-30) and the meeting will include a special session that focuses on the biology and ecology of Olympia oysters.

C. Progress on project objectives for this reporting period:

- Describe progress on tasks related to project objectives for this reporting period.
- What data did you collect?
- Has your progress in this period brought about any changes to your methods, the integration of intended users, the intended users involved or the project objectives?
- Have there been any unanticipated challenges, opportunities, or lessons learned?
- What are your plans for meeting project objectives for the next six months?

All of the graduate students specifically recruited as members of the science team have begun their work at the Oregon Institute of Marine Biology, they have received orientations to the research problems and the collaborative approach followed during the NSC project to incorporate input from stakeholders into the design of their thesis work, and they have begun to develop preliminary approaches and techniques for the acquisition of data.

Several different types of data were collected by members of the science team over the fall and winter months. Mark Oates (Module 1/ reproduction) has developed field sampling protocols and histological techniques to characterize the seasonal gametogenic cycle and brooding behavior of Olympia oysters. Cate Pritchard (module 2 / larval supplies and dispersal) has generated data to describe the drift trajectories for drogues released within the Coos Bay navigational channel to simulate the advection and dispersal of planktonic oyster larvae. Rose Rimler has developed laboratory techniques to maintain brooding female oysters in the laboratory, to provide the planktonic larvae with different rations of food, and to monitor the success of recently settled Olympia oysters in the intertidal zone. In addition, the South Slough NERR continues to collect: (A) time-series measurements of estuarine water quality parameters (estuarine water temp, sal, cond, pH, DO, Chl-a, turb) at several locations along the estuarine gradient of the South Slough). These data are coupled with: (B) time-series measurements of estuarine water temperatures generated by Hobo TidBit dataloggers deployed at several locations in the mesohaline region of Coos Bay (A. Shanks / L. Garcia; OIMB); and (C) monthly CTD casts within the primary tidal channel of Coos Bay (A. Shanks / L. Garcia; OIMB).

Changes in methods: Stakeholder concerns were raised earlier in the year about the potential impacts of dredging (associated with excavation and placement of a Liquefied Natural Gas pipeline), turbidity, and sedimentation on survival of populations of native Olympia oysters. In response to this concern, members of the project team and OORAC

worked together it outside consultants and external advisors to develop a population survey and mitigation plan to offset any damages to intertidal and subtidal populations of Olympia oysters in Haynes Inlet. The science team and OORAC will give further consideration to the need for a new L:D-50 bioassay experiment to assess the tolerance and susceptibility of Olympia oyster larvae, post-larvae, and juveniles to exposure to different sediment loads and sedimentation treatments.

Unanticipated challenge: The communities of Coos Bay, North Bend, and Charleston continue to be actively engaged in public debate regarding the scoping and feasibility studies for construction of a new liquefied natural gas (LNG) terminal located along the shoreline of Coos Bay at Jordan Cove. It is recognized that the OORAC must address the issue of LNG/Oyster trade-offs during development of the Olympia oyster conservation plan, and it is likely that members of the science team and OORAC may be asked to provide opinions and/or testimony on this issue as the local planning process continues.

During the next six months, the project team will hold a project budget session and OORAC de-briefing meeting (March 2) to follow-up on the feedback and input provided during the OORAC meeting. The project team will also design and conduct a baseline survey of the spatial extent and distribution of Olympia oyster populations along the shoreline of Coos Bay, develop a fact-sheet to summarize the agency jurisdiction and regulatory authorities for management of commercial oyster mariculture operations in Coos Bay, and conduct small group meetings with the four commercial oyster growers. The science team will also assemble and distribute further background material about Olympia oyster recovery efforts in different bays and estuaries, and incorporate OORAC feedback to develop a draft outline for the local Olympia Oyster Conservation Strategy. The project team will finalize the spring season workplans for the graduate students, and hold the next OORAC meeting at the end of May or early June.

- D. Benefit to NERRS and NOAA: List any project-related products, accomplishments, or discoveries that may be of interest to scientists or managers working on similar issues, your peers in the NERRS, or to NOAA. These may include, but are not limited to, workshops, trainings, or webinars; expert speakers; new publications; and new partnerships or key findings related to collaboration or applied science.

The science team developed a series of six Olympia oyster fact-sheets:

- Collaborative process to assist with research and recovery for populations of native Olympia oysters
- Natural history, geographic distribution, and life-cycle of Olympia oysters
- Restoration and recovery of native Olympia oysters in the South Slough estuary, Oregon
- Observations of gonad structure and gametogenic timing in a recovering population of Olympia oysters
- Larval abundance and dispersal as critical factors in the recovery of Olympia oysters in Coos Bay
- Larval settlement and post-settlement mortality as determinants of the spatial distribution of Olympia oysters in Coos Bay

- E. Describe any activities, products, accomplishments, or obstacles not addressed in other sections of this report that you feel are important for the Science Collaborative to know.

- The Oregon Department of Fish and Wildlife / Marine Resources Program / Shellfish Program was identified in the original proposal as one of the primary intended users of work products generated by the project. As the leader of the statewide Oregon Shellfish Management Program, Dr. Leslee Parr was a key Intended User of the information generated by the project, and a letter of commitment written by Dr. Parr on behalf of the ODFW Shellfish Program was included in the original project proposal. Dr. Parr has since resigned her position with the state natural resource agency to take on another responsibility in academia. In response to her resignation, ODFW initiated the agency recruitment process to identify a new leader for the state-wide shellfish program, and Dr. Steve Rumrill was selected to fill this key leadership position. Steve continues to function as an adjunct member of the faculty at the University of Oregon, and as the principal Investigator for the NSC Olympia oyster project. Mr. Scott Groth (ODFW Shellfish Biologist) serves as a member of OORAC and as the agency representative from the Oregon Department of Fish and Wildlife / Shellfish Program.

OLYMPIA OYSTER RECOVERY ADVISORY COMMITTEE

Meeting Agenda

Tuesday / February 28, 2012 (9 AM to 3:30 PM)

Boathouse Auditorium (Oregon Institute of Marine Biology, Charleston, OR 97420)

Purpose: The Olympia Oyster Recovery Advisory Committee (OORAC) will provide stakeholder perspectives, practical knowledge, and technical expertise during development of the Olympia Oyster Conservation and Recovery Strategy for Coos Bay. Input from OORAC will be applied directly to a series of research projects conducted by local scientists and graduate students at the Oregon Institute of Marine Biology. A collaborative process (Joint Fact-Finding / Structured Decision-Making) will be followed to ensure that stakeholders and local scientists work together to define the problems, identify data gaps, conduct the necessary research, and to develop a practical strategy to assist with the conservation and recovery of Olympia oyster populations

- 9:00 AM** Meeting purpose and agenda: Steve Rumrill
- 9:15 AM** Introduction of OORAC members and project team (name, affiliation, interest in Olympia oysters): Steve Rumrill
- 10:00 AM** Collaborative process to collect and incorporate OORAC input: Frank Burris
- 10:30 AM** *Coffee break*
- 10:45 AM** Background Information #1: Natural history, ecology, and recovery of Olympia oysters in Coos Bay / Steve Rumrill & Scott Groth
- 11:00 AM** Olympia oyster enhancement along the shoreline of isthmus Slough / Rex Miller
- 11:15 AM** Background Information #3: Larval supplies, dispersal, and retention of Olympia oysters in Coos Bay / Laura Garcia-Peterio
- 11:45 AM** Input from OORAC Members: questions, perspectives, discussion / Frank Burris
- 12:00 Noon** *Lunch*

NSC Project Goal / investigate the importance of reproduction, larval supplies, estuarine retention time, settlement, and recruitment as factors that potentially limit recovery of self-sustaining populations of Olympia oysters in Coos Bay

- 1:00 PM** New Science Module 1: Reproduction of Olympia oysters / Mark Oates
Discussion: feedback & input from OORAC members
- 1:30 PM** New Science Module 2: Larval supplies and local dispersal / Cate Pritchard
Discussion: feedback & input from OORAC members

- 2:00 PM** New Science Module 3: Larval settlement and metamorphosis / Rose Rimler
Discussion: feedback & input from OORAC members
- 2:30 PM** Development of an Olympia Oyster Conservation and Recovery Strategy for
Coos Bay: Steve Rumrill & Frank Burris
- 2:45 PM** OORAC communications and delivery of technical information: John Bragg &
Jamie Doyle
- 3:15 PM** Wrap-up, meeting schedule and next steps: Frank Burris
- 3:30 PM** **Adjourn**

Appendix B. Photographs during OORAC meeting (28 February 2012)



Figure 1. Project Integration Leader Frank Burris at work to help identify information needs and data gaps addressed during the new science components of the NSC Olympia oyster project.



Figure 2. Project Integration Leader Frank Burris facilitating a discussion among OORAC members regarding the collaborative process followed to develop an Olympia oyster conservation and recovery strategy.



Figure 3. OORAC member Rex Miller describing habitat enhancement activities undertaken on his own property along the banks of Isthmus Slough designed to foster settlement, recruitment, and recovery of Olympia oysters.



Figure 4. Side-board conversations among the science team and OORAC members during a winter storm on the Oregon coast.